

CLAIMS:

1. A method of noise whitening a received signal, the method comprising the steps of:
 - 5 estimating the noise of a channel;
 calculating the power spectrum of the channel;
 adding the estimated noise and the calculated power spectrum to build a positive definite band matrix;
 applying symmetric factorisation to the matrix;
 - 10 deriving the spectral factorisation of the channel from the symmetric factorisation;
 approximating the spectral factorisation;
 calculating the noise whitening prefilter settings from the approximated spectral factorisation and the
 - 15 estimated noise of the channel; and
 prefiltering the received signal to noise whiten the signal.
2. A method according to claim 1, wherein the step of
20 calculating the noise whitening prefilter settings comprises direct polynomial division of the approximated spectral factorisation and the estimated noise of the channel.
- 25 3. A method according to claim 1 or 2, wherein the power

spectrum is calculated by autocorrelation.¹⁷

4. A method according to any one of claims 1 to 3,
wherein the symmetric factorisation is square-root-less
5 Cholesky factorisation.

5. A method according to any one of claims 1 to 4,
wherein the spectral factorisation is approximated by
reversing the non-zero elements of the last row of the
10 decomposed lower triangle of the matrix.

6. A method according to claim any one of claims 1 to
5, wherein the band symmetric factorisation comprises a
Toeplitz matrix.

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7. A method for setting a prefilter of an equalizer
comprising calculating the noise whitening prefilter
settings according the method of any one of claims 1 to
6.

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8. A prefilter for an equalizer having noise whitening
settings derived by the steps of:

estimating the noise of a channel;

calculating the power spectrum of the channel;

25 adding the estimated noise and the calculated power
spectrum to build a positive definite band matrix;

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applying symmetric factorisation to the matrix;
deriving the spectral factorisation of the channel
from the symmetric factorisation;
approximating the spectral factorisation; and
5 calculating the noise whitening prefilter settings
from the approximated spectral factorisation and the
estimated noise of the channel.

9. An equalizer for a demodulator of a wireless
10 communication system comprising a prefilter according to
claim 8.

10. A device for demodulating a signal transmitted via a
channel comprising:

15 a channel estimator for generating a channel
estimate for said channel;

prefilter setting means for deriving noise whitening
settings for a prefilter by the method according to any
one of claims 1 to 6;

20 a prefilter, set according to the settings derived
by the prefilter setting means, for noise whitening said
signal; and

a sequence estimator for estimating any distortion
caused during transmission of said noise whitened signal.